



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/511,934	02/24/2000	Hideaki Fukuda	ASMJP.032AUS	5598

7590

09/01/2004

KNOBBE, MARTENS, OLSON & BEAR, LLP
2040 MAIN STREET
14th FLOOR
IRVINE, CA 92614

EXAMINER

KACKAR, RAM N

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 09/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

Office Action Summary

Application No.

09/511,934

Applicant(s)

FUKUDA ET AL.

Examiner

Ram N Kackar

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-7,9,10 and 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-7,9,10 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) ☐ Other: _____

DETAILED ACTION

Your RCE dated 10/23/2003 is acknowledged.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-7, 9-10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel et al (US Patent 6019848) in view of Kao et al (US Patent 6125859).

Frankel discloses a susceptor with a heater (Fig 11) provided in a reaction chamber (Fig 1A- 200), conveyor for loading and unloading the wafers in to the reaction chamber (Col 25 line 1-3), cleaning device comprising a controller of gas (Fig 1D 153 and 163), vacuum controller (Fig 1D-165), a cleaning gas activator (Col 54 line 39 or Fig 1A 55), a program which instructs the controller to take the substrate out of the reaction chamber after processing and proceed with the chamber clean using activated cleaning gas (Fig 1D --157a and Col 54 line 8-29), evacuate the chamber after cleaning (Col 56 line 10-22), typical range of 500-800 C for deposition temperature (Col 53 line 38-41), cleaning gas being Fluorine (Col 9 line 13-15) and Fluorine radicals (Col 54 line 34), a plasma discharge region (Col 54 line 39), a remotely located plasma discharge chamber (Fig 1A -55), unwanted deposits like silicon oxide (Col 9 line 24-26), a plasma CVD apparatus (Col 2 line 31-34) and a shower head above the susceptor in the reaction chamber (Fig 5- 20).

Frankel et al do not expressly disclose the step of inert gas flow and reduction of susceptor temperature prior to start of the cleaning gas activation.

Kao et al disclose introduction of inert gas prior to introduction of reactive cleaning gas (Abstract) and both Frankel and Kao disclose flow of inert gas prior to any reactive gas (cleaning gas is a reactive gas) for pressure stabilization (Frankel – Col 18 lines 65-68 and Kao-Col 11 lines 53-60) and disclose a preferred temperature range of pedestal during the cleaning process to be 400°-700° C (Kao- Col 17-lines 59-63 and Frankel- Col 54 lines 67 to Col 55 line 1). Since inert gas does not react, its introduction prior to or simultaneously with temperature reduction is immaterial.

Therefore it would have been obvious to one having ordinary skill in the art at the time invention was made, to add the step of inert gas introduction for pressure stabilization and removal of particulates before introduction of reactive cleaning gas and simultaneously with temperature reduction of the susceptor to bring it to recommended range (400-700) as per the teaching of Kao et al.

Response to Amendment

Applicants arguments filed on 8/21/2003 are considered but not found to be persuasive.

Applicant has argued that the range of temperature “ about 470 ° C or lower “ is critical and achieves unexpected results and has filed a second declaration under rule 1.132 to support this claim.

The declaration under 37 CFR 1.132 filed 8/21/2003 is insufficient to overcome the rejection of claims 1, 4-7, 9-10 and 21 based upon 35 U.S.C. 103(a) over Frankel et al (US

Patent 6019848) and Kao et al (US Patent 6125859) as set forth in the last Office action (repeated above) because of the following:

The Affiant /Declarant states that experiments were done to study particles accumulated on the showerhead when the temperature of the susceptor was kept at 600, 500 and 470. The other operating parameters were kept constant. The affiant does not state what those parameters were, except mentioning that they were conducted in accordance with the example described in the specification.

The affiant has demonstrated that when all other parameters were held constant at a certain value, the accumulation of particles reduced as the temperature of the susceptor was gradually reduced from 600 to 500 to 470. At 470 no accumulation of particles was observed. No experiment was conducted in the claimed critical range, at a temperature below 470 (See MPEP 716.02 (d) and *In re Hill*, 284 F.2d 955, 128 USPQ 197 (CCPA 1960)).

Nevertheless, even if it is agreed that the accumulation of particles remained near zero below 470, it only proves a gradual improvement and a trend. It does not show the criticality of "470 and below".

Secondly, the effect of other operating parameters on this range is not demonstrated. This observation is relevant in view of the disclosure by Kao et al as below.

"The chamber parameters used in a cleaning process according to the method of the present invention may vary widely while still providing acceptable cleaning of processing chamber 15, but certain ranges provide particularly efficient and complete cleaning of the chambers interior surfaces" (Col 17 lines 37-43).

Application/Control Number: 09/511,934
Art Unit: 1763

Page 5

Since the scope of the claim is not narrowed to the range of operating parameters where the range of "470 and below" is found valid nor it has been proved that this range is independent of those other operating parameters, the criticality of this range "470 and below" is not demonstrated.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 703 305 3996. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703 308 1633. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.

Please note that in early part of December 2003 examiners phone number will change to 571-272-1436.

RK


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1763